

RESPONSE

Applicants, through their attorney, respectfully request the Examiner to consider the application in view of the included remarks.

Support

Applicants have amended claims 1 to 9 and 20 to 25 have been amended to specify fuel compositions, as opposed to methods of fueling an internal combustion engine using said fuel composition. Support for these amendments is found in the claims as filed as well as the specification.

Applicants have amended claim 1 to specify a Mannich reaction product of a polyisobutylene alkylated hydroxyaromatic compound, a formaldehyde or a reactive equivalent thereof, and a secondary monoamine component comprising dimethylamine, where the said polyisobutylene alkylated hydroxyaromatic compound is derived from a combination of a conventional polyisobutylene and a high vinylidene polyisobutylene; and wherein the said polyisobutylene alkylated hydroxyaromatic compound is derived by combining the conventional polyisobutylene and the high vinylidene polyisobutylene prior to the alkylation of the hydroxyaromatic compound; or combining a hydroxyaromatic compound alkylated with the conventional polyisobutylene and a hydroxyaromatic compound alkylated with the high vinylidene polyisobutylene, where the ratio of conventional polyisobutylene to high vinylidene polyisobutylene is from 25:75 to 40:60 on a weight basis and further specifying that the Mannich reaction product is present in the specified fuel composition from 10 to 10,000 ppm.

Support for the amendments regarding the aldehyde and amine are found in claim 9 as filed, page 9, lines 11 to 13 and 23-25 of the specification. Support for the amendments regarding the ratio of conventional and high vinylidene polyisobutylene is found on page 6, line 32 to page 7, line 3 of the specification. Support for the amendments regarding the treat rate of the Mannich reaction product in the described fuel composition is found on page 12, lines 26-32.

Claims 17 and 26 to 32 have been cancelled.

No other elements of the claims have been amended.

Response

The Examiner rejected claims 20, 22-23, 25, 27 and 29-32 under 35 U.S.C. §112 and §101 for not setting forth any steps involved in the claimed method and/or process. Due to the amendments and cancellations above which directed the remaining claims to

fuel compositions as opposed to methods and processes, Applicants respectfully submit that these rejections are moot and ask that they be removed.

The Examiner rejected claims 1 to 9 and 20 to 32 under 35 U.S.C. 103(a) as being unpatentable over Carabell (US 2003/0172582). The Examiner continues to read Carabell as teaching Mannich fuel additives derived from polyisobutylenes (PIB) that, among other embodiments, may have a methylvinylidene isomer content of at least 20%. The Examiner concludes that this teaching in Carabell at least makes obvious the features of the present invention specifying a mixture of conventional PIB and high vinylidene PIB. The Examiner has not been persuaded by Applicant arguments and evidence that shows conventional PIB and high vinylidene PIB are substantially different materials, that Carabell provides no teaching of conventional PIB let alone the combination of conventional PIB and high vinylidene PIB in the preparation of a Mannich additive, and that the compositions of the present invention provide surprising and unexpected results not taught by the reference.

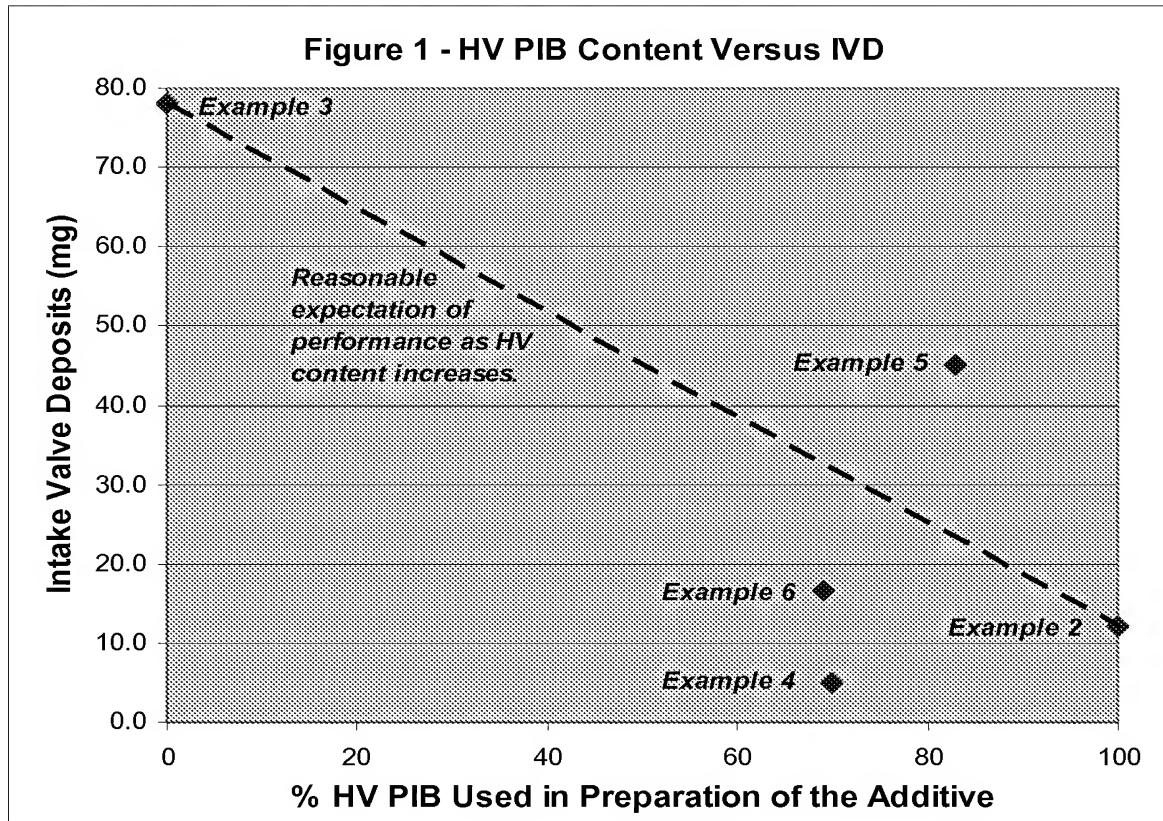
The Examiner responds in the present office action that Carabell, in [0057] teaches various mixtures of PIB, including ULTRAVIS 10 which the Examiner contends contains PIB and HV PIB and further finds that the data provided in the specification is not commensurate in scope with the present claims.

Applicants continue to disagree with the Examiner on the reading of Carabell for the reasons set further above and in the previous office action. However, in the interests of moving this case forward Applicants have amended the claims to bring them in-line with the data in the specification, and to make them commensurate in scope with the surprising results demonstrated by that data.

Applicants have amended the claims to specify that the Mannich reaction product is derived from a polyisobutylene alkylated hydroxyaromatic compound, formaldehyde or a reaction equivalent thereof, and a secondary monoamine that includes dimethylamine. Furthermore the claims specify that the polyisobutylene alkylated hydroxyaromatic compound is derived from a combination of a conventional polyisobutylene and a high vinylidene polyisobutylene and that the ratio of conventional polyisobutylene to high vinylidene polyisobutylene is from 25:75 to 40:60 on a weight basis, and that the Mannich reaction product is present in the fuel composition from 10 to 10,000 ppm. These amendments narrow the claims around the data in the specifica-

tion which show unexpected and surprising results made possible by the claimed compositions.

Specifically, the data in the specification shows that examples that fall within the scope of the current claims provide unexpectedly improved performance compared to 100% conventional polyisobutylene-derived Mannich reaction products, better than the reasonably expected performance of Mannich reaction products derived from mixtures of conventional and high-vinylidene polyisobutylene-derived Mannich reaction products, and better than the actual performance of other Mannich reaction products derived from mixtures of conventional and high-vinylidene polyisobutylene in ratios that do not fall under the scope of the amended claims. In order to better illustrate the data in the specification, the following figure is provided:



The details of the individual examples and the testing completed are provided in the specification. The figure shows the intake valve deposit (IVD) results from the examples in the specification, with the percent of high vinylidene polyisobutylene present in the polyisobutylene used to make the Mannich reaction product. The balance of the polyisobutylene in each example was conventional polyisobutylene. Lower IVD

results indicate improved additive performance. The figure includes an example made with 0% high vinylidene polyisobutylene (100% conventional polyisobutylene), Example 3, and 100% high vinylidene polyisobutylene (0% conventional polyisobutylene), Example 2. A trend line between these points represent the expected result one skilled in the art might have had given these two results and the teachings of the prior art, which does not indicate any benefit to using mixture of conventional and high vinylidene polyisobutylene.

The figure then also shows the results of two inventive examples, Examples 4 and 6, and comparative example 5. Examples 4 and 6 give unexpectedly improved performance compared to the expected trend line. Meanwhile, Example 5, which is outside the scope of the amended claims, gives performance better than the 100% conventional polyisobutylene examples but below the expected performance trend line. Thus the additives described in the present claims provide improved performance not taught by the references and not reasonably expected given the teachings of the art. Therefore, the present invention represents a selection over the prior art and the present claims are commensurate in scope with the data provided in the specification.

Conclusion.

For the foregoing reasons it is submitted that the present claims are novel and non-obvious, and in condition for allowance. The foregoing remarks are believed to be a full and complete response to the outstanding office action. Therefore an early and favorable reconsideration is respectfully requested. If the Examiner believes that only minor issues remain to be resolved, a telephone call to the Undersigned is suggested.

Any required fees or any deficiency or overpayment in fees should be charged or credited to deposit account 12-2275 (The Lubrizol Corporation).

Respectfully submitted,

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